

# PATENT SPECIFICATION

DRAWINGS ATTACHED

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## COMPLETE SPECIFICATION

### Swivel Nozzles for Sheet Caliper Control of Paper

We, LODDING ENGINEERING CORPORATION, A Corporation of Massachusetts, United States of America, of Sword Street, Auburn, Massachusetts, United States of America, do hereby declare the invention for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

- 10 This invention relates to controlling the caliper of a sheet of paper during formation thereof by applying an air stream directed against a calendering roll over which the paper travels. Thus if the air is cool, the roll is caused to shrink slightly, thereby increasing the caliper of the calendered sheet at that point.

- 15 The cool stream of air is provided by a series of independently regulated air nozzles directing air against the roll in a line across the machine, and the control of the caliper is achieved by opening those valves in the areas across the sheet wherein the caliper is desired to be increased.

- 20 This invention contemplates the provision of special new and improved means mounting the nozzles to swivel in a plane in which the nozzles themselves are mounted, so that a series of two or three nozzles for instance can all be turned to direct the air at a single point, thereby increasing the effect of the caliper control at this point.

Reference is to be had to the accompanying drawing, in which:

- 25 Fig. 1 is a plan view illustrating the invention;  
Fig. 2 is an enlarged section on line 2—2 of Fig. 1;  
Fig. 3 is a plan view showing the nozzle, looking in the direction of arrow 3 in Fig. 2, and

Fig. 4 is a view in rear elevation of the device, looking in the direction of arrow 4 in Fig. 3.

Fig. 3.

In illustrating the invention, the same is shown as applied to a calender roll for instance which has a roll surface generally indicated by the reference numeral 10 in Fig. 1. An air plenum chamber 12 is provided and this extends across the machine in parallelism to the roll surface. This chamber can be tiltingly adjusted as by trunnions indicated in Fig. 2 by the reference numeral 14. The chamber is conveniently mounted on the usual doctor back if desired.

Mounted on the top surface 16 of the plenum chamber 12 is a series of nozzles each generally indicated by the reference numeral 18 and these are connected with the plenum chamber 12 as for instance through openings 20 (see Fig. 2), by which means the streams of air are directed against the roll surface.

Each nozzle is in the general form of a barrel or sleeve 22 preferably having a reduced tip 24. Each nozzle is in adjustable communication relative to its opening 20 through a circular thimble 26 having an opening 28 through the body of the nozzle leading into the interior thereof, i.e., as at 30.

Each nozzle has a rearward cylindrical portion 32 closed for instance by an end plug 34 which has an axial passage there-through for the sliding reception of the stem 36 of a piston body 38 which forms a valve actuated in a rectilinear direction by means of a handle 40 attached to the rod 36. An O-ring or other packing 42 can be used to render the same air-tight. The valve is shown fully closed in Fig. 2 but if the handle 40 is retracted to the right the valve will be open to such a degree as is determined by the degree of retraction.

Each nozzle is mounted in the top wall 16 of the plenum chamber by a swivel base

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generally indicated at 44 which comprises a flange secured to the top wall 16 of the plenum chamber by a pair of fasteners at 46, 46. Base 44 is provided with an upstanding sleeve-like member or annular flange 48 provided with annular packing 50 and having an annular groove or notch 52 for the reception of fasteners 54 in the form for instance of a socket-head setscrew preferably having a half-dog point for securing the nozzle in its swiveled adjusted position.

It is preferred that the swivel nozzle not be mechanically secured to the sleeve 48 except as held by the screws 54 so that it can be turned in either direction as may be required, but the same time the packing 50 makes the device air-tight, and by adjusting the screws 54 correctly, a frictional fit can be achieved so that the nozzles will tend to stay where turned.

All of the nozzles can be adjusted to lie at general right angles to the surface of the calender roll and they can be operated in the normal manner in this way in order to cause cooling of the roll surface at the points indicated. At the same time they can also be swiveled as shown in Fig. 1 to any degree within the limits between them. Thus it will be seen that any point on the roll can be serviced, that is by swiveling an indicated nozzle to a relatively small degree or to the degree desired, but in addition to this, two or even three nozzles as shown in Fig. 1 can be adjusted so that all bear on the same point of the roll surface, thus increasing the effect of the caliper control.

#### WHAT WE CLAIM IS:—

1. A sheet caliper control device for paper making machines comprising in combination a calendering roll, a source of fluid under pressure, means forming a chamber extending generally parallel to said roll substantially the extent thereof, said chamber being connected to the source of fluid under pressure, and a series of nozzles arranged along the chamber and connected thereto, each nozzle being adapted to direct a stream of fluid against the roll surface, a valve for each nozzle opening and closing the nozzle with respect to the chamber, and a swivel base for each nozzle, each nozzle being adapted to swivel on its base to provide for the line of nozzles directing air at any longitudinal point along the roll surface.

2. The sheet caliper control device of claim 1 wherein at least two of the nozzles are adapted to be swiveled toward each other to direct their stream of fluid at a single point on the roll.

3. The sheet caliper control device of claim 1 wherein a plurality of nozzles are adapted to swivel to a sufficient degree to direct their streams of fluid against a single point on the roll surface.

4. A sheet caliper control device comprising a calendering roll, a plenum chamber parallel to and extending along the roll, said plenum chamber having a top wall, means supplying fluid under pressure to said plenum chamber, a series of nozzles mounted on the top wall of the plenum chamber, said nozzles being elongated and pointing in the same direction to provide a single row of jets of fluid against the roll surface substantially from end-to-end of the roll, a swivel base for each nozzle, each swivel base being mounted on the top wall of the plenum chamber, means fastening the swivel bases thereto, each swivel base including an upright annular flange, a depending annular skirt on each nozzle, the skirt of each nozzle fitting and swiveling on the upstanding annular flange of its respective base, the flange of the skirt being open for communication from the plenum chamber into the nozzle, and a valve for each nozzle to adjustably control the flow of the fluid from the plenum chamber to the nozzle and thence to the roll surface.

5. The sheet caliper control device of claim 4 including means for adjustably holding each nozzle in its swiveled adjusted position with respect to its swivel base.

6. The sheet caliper control device of claim 4 wherein the nozzles are generally coplanar and swivel in their plane toward and away from each other.

7. The sheet caliper control device of claim 4 wherein the axes of the swivel bases are arranged in spaced parallel relationship at right angles to the top wall of the plenum chamber.

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